El estudio de egresados para la mejora continua de las Universidades: Estudio de caso de la Ingeniería en Computación

The study of graduates for the continuous improvement of the Universities: case study of the computer engineering

Os graduados estudando para a melhoria contínua das Universidades: Caso Engenharia Estudo Computer

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Resumen

El presente artículo presenta un estudio de egresados para conocer las características de los egresados de la Licenciatura en Computación del Centro Universitario de la Ciénega, nos da una muestra acerca del desarrollo académico el cual será reflejado en el campo laboral. Este estudio se realizó como parte de la mejora continua que deben efectuar las Instituciones de Educación Superior con el propósito de medir el impacto real que tienen las diferentes carreras en la formación de material humano, como son los profesionales egresados. El 87.5% de los egresados obtuvieron su primer empleo antes del primer año de haber

concluido sus estudios de licenciatura, lo cual refleja un aspecto importante para el estatus de la licenciatura a nivel laboral. La obtención de los datos se obtuvo a través de una investigación cualitativa, usando una encuesta como un instrumento de medición. Los resultados obtenidos señalan que los egresados están desarrollando su trabajo en su área de competencia y de su perfil de la carrera, mencionando además algunas de las fortalezas y áreas de mejora de la misma.

Palabras clave: computación, egresados, encuesta, mejora continua, educación superior.

Abstract

This article presents a study of graduates to understand the characteristics of the graduates of the Bachelor of Computing of the La Cienega University Centre, gives us a sample about the academic development which will be reflected in the labour field. This study was carried out as part of continuous improvement to be carried out by the institutions of higher education in order to measure the real impact that have different races in the formation of human material, such as alumni professionals. 87.5% of the graduates obtained their first job before the first year of having completed her undergraduate studies, which reflects an important aspect for the status of the degree at the working level. The data was obtained through a qualitative research, using a poll as a measuring instrument. The results obtained indicate that graduates are developing their work in their area of competence and your career profile, mentioning in addition some of the strengths and areas for improvement.

Key words: computing, graduates, survey, continuous improvement, higher education.

Resumo

Este artigo apresenta um estudo de licenciados para conhecer as características dos formandos do Bacharelado em Ciência da Computação pelo Centro Universitário do Cienega nos dá uma amostra sobre o desenvolvimento acadêmico que será refletido no local de trabalho. Este estudo foi realizado como parte da melhoria contínua a ser feita pelas Instituições de Ensino Superior com o objetivo de medir o impacto real das diferentes raças na formação de material humano, tais como profissionais graduados. 87,5% dos graduados

obtiveram o seu primeiro emprego antes do primeiro ano de ter completado seus estudos de graduação, refletindo um status significativo grau no aspecto nível de trabalho. A obtenção de dados foi obtida através de uma pesquisa qualitativa utilizando uma pesquisa como um instrumento de medição. Os resultados indicam que os graduados estão desenvolvendo seu trabalho na sua área de competência e perfil de carreira também mencionar alguns dos pontos fortes e áreas de melhoria do mesmo.

Palavras-chave: graduados de computação, pesquisa, melhoria contínua, o ensino superior.

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Introducción

At the beginning of this 21st century individuals and organizations experience the characteristics of a world globalized, largely due to new information and communication technologies. That is why the institutions of higher education is considered among one of its objectives the training of professionals able to adapt to a competitive and changing employment context.

This is not an easy task since it requires that universities remain at the forefront in their plans of studies, infrastructure and processes of teaching and learning, with the vision of developing professional skills requiring the labor.

According to Skatkin (1979), cited by Herrera (2006) there are a set of skills that should encourage universities to prepare students for the world of work, such as:

> *Appropriation of scientific knowledge of work processes and their corresponding associations; Application of knowledge from different disciplines in the productive and creative work; Attitude to acquire new knowledge; Practical experience allows new generalizations* (pg. 60).

Before these approaches is the need for a link between the labour market and Universities. One way of establishing that communication is through the relationship Company-University that includes activities of outreach as: employers and studies of graduates, with the objective of maintaining a relationship with the labour market.

Studies on graduates are investigations that allow to know the situation context, economic, labor and academic, i.e. the features professionals and graduates of an institution staffs. The Association alpha (2006) mentions that one of the purposes of these studies is to obtain data that can serve as indicators of performance:

> *Alumni surveys can also be designed to contribute to the causal explanations of the relevance of the study conditions and services provided by institutions of higher education, as well as the "performance" of graduates in the labour market* (Alfa, 2006, pg. 17).

This is why that is considered that the implementation of such studies are fundamental inputs so that institutions will self-evaluate and discuss the academic of each of their educational purposes.

In this sense Alfa (2006), Guzmán, Feldes, Corredera and Flores (2008) suggest that graduates studies are essential for the processes of analysis inputs and redesign curriculum of higher education institutions, since:

> *They offer information on the characterization of professionals under aspects of hiring and employment exercise* (pg. 29).

Likewise the Pontifical Xavierian University (2012) and Cáceres(2006), proposed that studies of graduates has the objectives of:

> *To obtain the socioeconomic characterization of the recent graduates, to know their work situation at the time of their graduation, as well as, later, to fill out the survey, to compare the work situation of the recent graduates and to know the degree of satisfaction of the new graduates with the services That lent them the University as students and that lends them in their condition of graduates* (Pontificia Universidad Javeriana, 2012, pág. 12).

In addition to identifying strengths and weaknesses, and obtaining suggestions and recommendations for the University, aimed at strengthening the latter with its graduates and the national productive sector, and in complying with these objectives, graduate studies provide institutions with relevant information for The decision making to update the services, products and processes of any organization, contributing to raise the quality in its services.

The results of these alumni reports are important since they become a tool to analyze the paths that the new professionals follow. For Valencia, Rivera and Moguel (2007) the studies of graduates can be a reference of pertinence and quality of the educational programs of the Universities. On the contrary, Ávila and Aguirre (2005) mention that the result of the employment index that the studies of graduates show should not be considered as the only indicator of the quality of teaching in Higher Education Institutions. From what can be said that the studies of graduates give us a broad vision of the current situation of graduates, but that the phenomenon of employment is multifactorial, which is mediated by a number of other variables. This is why the studies of graduates not only characterize the labor market, but also follow the graduate and the perspective of the employer. Therefore, personal and professional aspects should be taken into account if the competencies developed in the graduates meet the demands of the labor market (Guzmán et al., 2008).

From the following approaches, a study was carried out at the University Center of La Ciénaga (CUCI), one of the regional centers of the University of Guadalajara, forming part of the University Network of Jalisco. It begins its functions in 1994, having three venues: Ocotlán, La Barca and Atotonilco El Alto. Bachelor's degrees are given in the Economic-Administrative, Engineering, Health and Biological areas, among others.

When graduating generations of a university degree, it is appropriate to know the characteristics of these students to establish some parameters that will be used to carry out the continuous improvement of the career, as well as a database that is useful for organisms Accreditors, which are essential for the follow-up of graduates. On the other hand, to know those aspects that allowed the obtaining of the academic degree.

The objective of this research was to obtain updated information about the situation of the graduates in terms of their work history and to identify the strengths and weaknesses in their professional training.

It is considered that this study allowed us to gather information about students' opinions regarding the impact during their stay in the SITC and the usefulness it has for their work development. Allow them to measure their professional performance and how they can be incorporated into the world of work. All these data will allow to feed back the educational processes in order to make the adjustments with the objective of improving the strategic development plan of the degree.

Methodologies for conducting studies of graduates

There are several methodologies to conduct a study of graduates who propose the different dimensions and categories that serve as a guide for their development. According to ANUIES (2003) Higher Education Institutions must have information about their graduates, it is best to carry out a census in which data are collected from all graduates over a period of time. So the studies of graduates can be classified in terms of their dimensions of years of graduation in:

- Studies oriented to census of graduates: it is carried out in the first year of discharge, whose objective is to concentrate information regarding the training received and the employment situation.
- Labor insertion surveys: it is carried out within the second and fifth year after graduation, designed to characterize the labor insertion process, the achievement of studies and its institutional satisfaction.
- Work experience surveys: it is carried out after five years of graduation and aims to obtain information about their employment status, acquired competencies and lifelong training.

From the scope of the study of graduates, it is suggested to use the survey as a tool, which is a reliable instrument. At the same time that this instrument is required to be applied to a significant sample, preferably to the entire generational cut, this will allow greater precision and confidence of the data obtained.

At the same time, ANUIES (2003) proposes within the dimensions of its variables the following: general characteristics of graduates, continuation of training, incorporation into the labor market, location in the labor market, professional performance, opinions about Vocational training received and recommendations for improving the vocational training profile (Fuentes, 2012).

Materials and methods

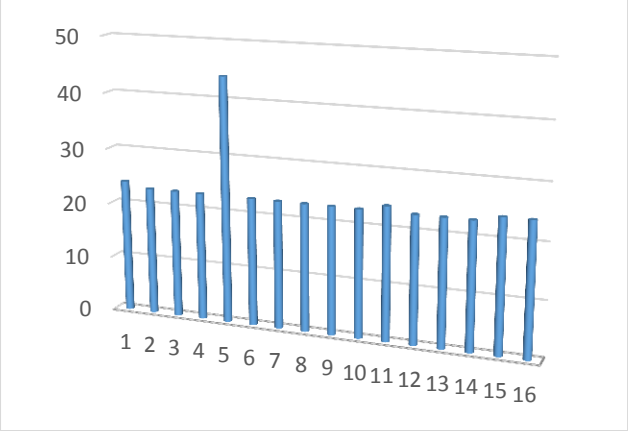
In order to carry out this research, a census-type study was conducted for the 2010-2014 generation of the Bachelor's degree in Computer Engineering of the CUCI. The questionnaire was used as an instrument considering the variables of: general characteristics of the graduates, employment status, continuation of studies and information about the training received. For this study we used the descriptive cross-sectional type since according to Hernández, Fernández and Baptista (2012); Hernández and Velasco-Mondragón (2000), cross-sectional surveys allow the verification of hypotheses and estimate factors associated with the studies of graduates.

A proportional sampling with 90% of confidence level and 10% of margin of error was considered, obtaining as a result of a total population of 22 graduates, a sample of 16.

Results

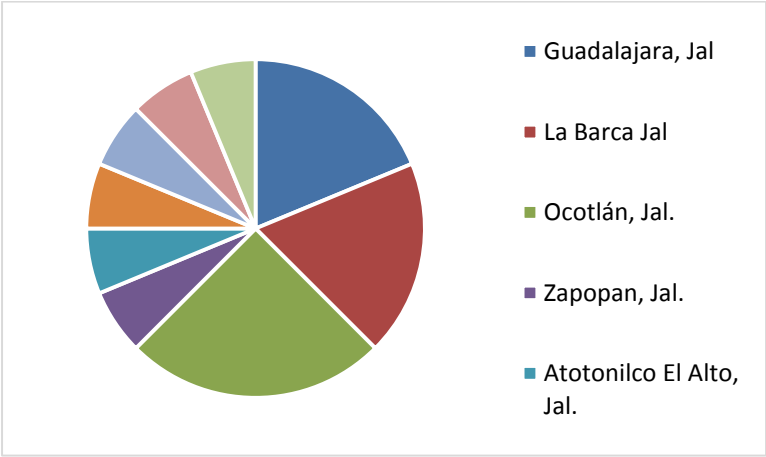
One of the first aspects to consider is the average age of the students, with the exception of one of them who was 44 years old, the majority fluctuated between the 23 to 26 years, being the average of 25 years.

Figure 1. Age of students of the 2010-2014 Generation of the Degree in Computer Engineering



Being a regional center, the cities of origin of the students is varied. 81.25% came from the state of Jalisco, with Ocotlan having the first place with 4 students (25%), followed by La Barca and Guadalajara with 3 each (18.8%). The rest of the students come from nearby cities that are in the area of influence of the university center.

Figure 2. Place of origin of the students of the Generation 201-2014 of the Degree in Computer Engineering



It is important for the students the level of preparation of the parents, as well as if within their families there are more people interested in carrying out studies at a higher level, that is, to know if they have siblings studying at a university. The survey revealed that of the total number of parents, 12 parents (37.5%) and 12 mothers (37.5%) had only elementary

schooling, followed by 3 (9.4%) parents and 6 (37.5%) mothers with secondary education. In high school, 2 parents (6.3%) and 3 mothers (18.8%), and with university studies, the data indicated that 3 were parents (9.4%), with one parent (3.1%) and 1 mother (9.4%). Which indicates that despite having little preparation were supported by their parents to achieve a professional title. The average number of siblings was 3 (10.7%) with a total of 28 siblings among the respondents. Of these, 10 are university students, representing 35.7%, being more than a third of the total. The chart shows a distribution of the study of mothers, fathers, brothers and sisters being an important support to encourage the study of a professional career.

Figure 3. Level of Parent Study

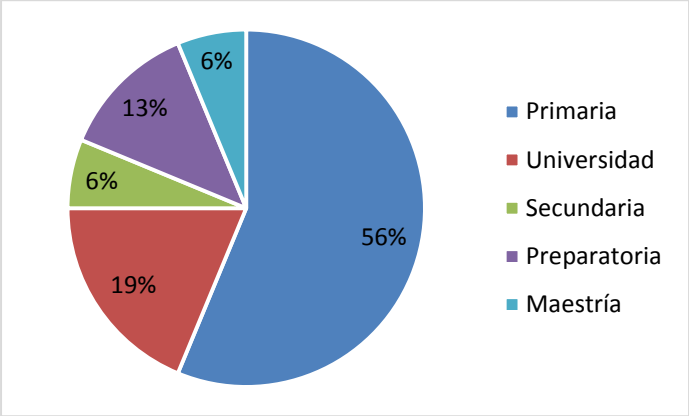
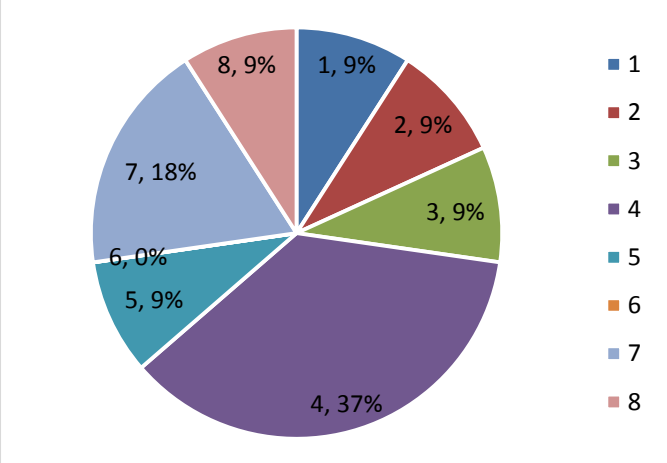
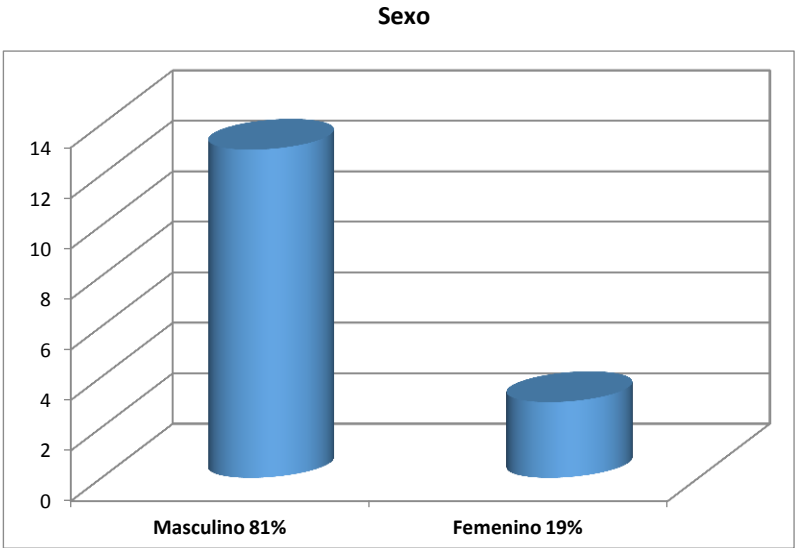


Figure 4. Number of university brothers



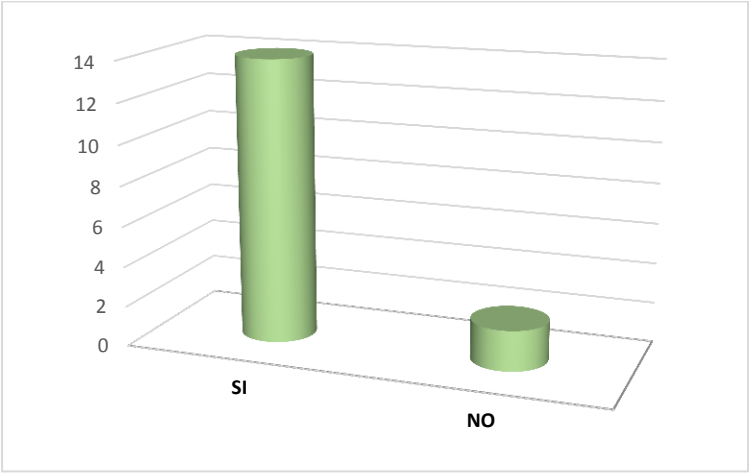
As far as the sex of the students of this degree is concerned, we can observe that 81% corresponds to men and 19% to women. This indicates that for the moment it is a race mainly chosen by men, although as in most cases the tendency tends to pair with the time. Regarding marital status, 100% corresponds to single students.

Figure 5. Sex of the students graduated from the Degree



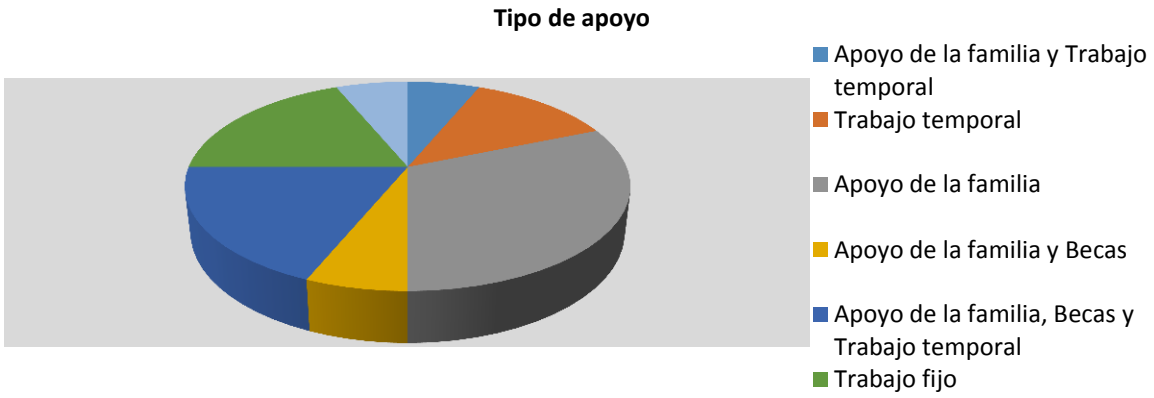
An important constant to mention is whether the choice of the degree was the first, since this may indicate the permanence and completeness of the studies. We can observe that 14 (87.5%) chose it as the first option and the rest (12.5%) was their second expectation.

Figure 6. Choice of Degree in Computer Engineering



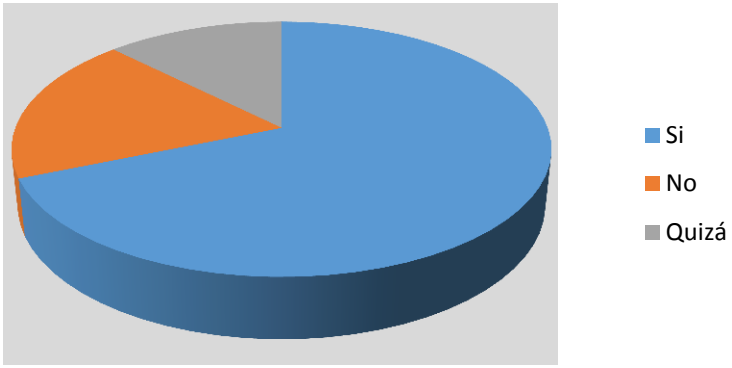
It is fundamental that the students who study at the University (any Bachelor in Higher Education) should have the support of the family, a fundamental piece in the proper development of the student's life. A total of 5 students received support from the family (31.25%), followed by scholarships and temporary work and fixed work, with 3 students for each option (18.75%).

Figure 7. Type of financial support received to study the Degree



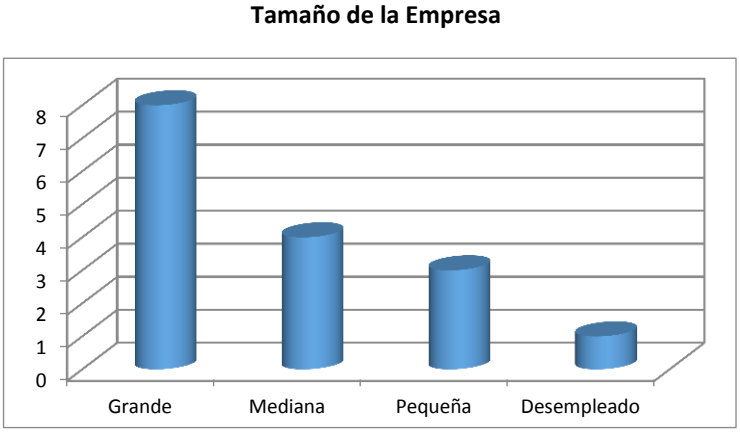
Considering that this is a relatively new profession and that is becoming increasingly important, it is necessary to continue with postgraduate studies. In general, most of them intend to continue their preparation after graduation. Of the total number of students surveyed, 11 (68.75%) answered affirmatively as to continue their preparation, while 3 of them (18.75%) do not have the same intention and 2 (12.5%) do not rule out this possibility.

Figure 8. Intent of postgraduate studies



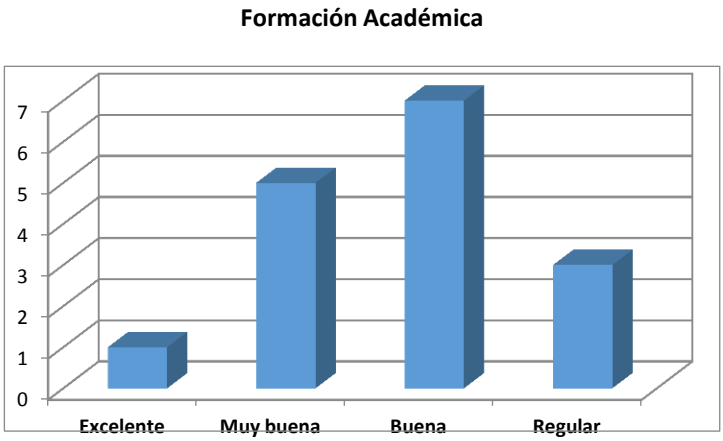
The size of the company in which the graduates work is a starting point to measure if the level of knowledge acquired is adequate for them to achieve good performance. When considering these aspects we can observe that 8 (50%) have joined large companies, 4 (25%) medium-sized and 3 (18.75%) in small companies. That is to say, more than 90% of the graduates were selected to work in important companies since in the opinion of their contractors they fulfilled the level that are required in this professional area.

Figure 9. Size of the company in which graduates work



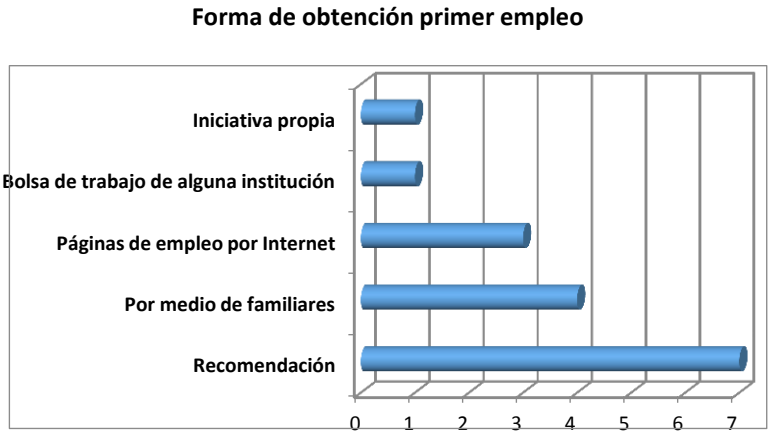
In relation to the previous information, it is important to know what they think about the level of academic training they received during their university career. This coincides with the recruitment data, since 7 (43.75%) mentioned that it was Good, 5 (31.25%) that was Very Good and 1 (6.25%) that was Excellent, indicating that more than 80% of respondents indicated That the level of knowledge received in their formative stage were important.

Figure 10. Opinion of the academic formation received in the University



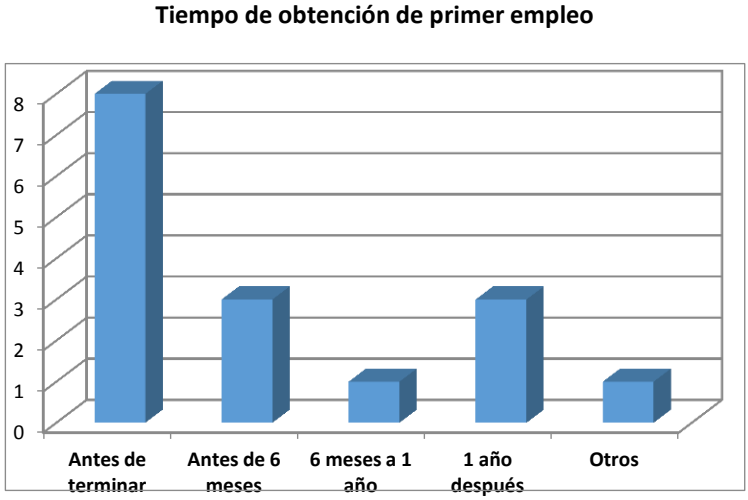
It is known that obtaining the first job is a very difficult situation, especially when you do not have verifiable work experience and you have a young age as a recent graduate. When reviewing the data of the survey, it indicates that the main form of obtaining the first job was by recommendations, 7 graduates (43.75%), followed by relatives 4 (25%) and 3 (18.75%) through Internet pages.

Figure 11. How to obtain the first job



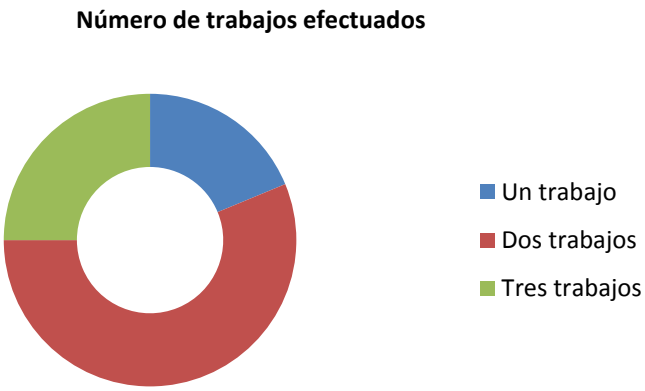
In addition to the way the first job is obtained, there is the time it takes to get it, as it is an indicator of the perception of training that potential employers have. It is important to note that 8 (50%) of the graduates found work before graduating from the degree, followed by 3 graduates (18.75%) who obtained it before 6 months and another 3 (18.75%) before one year. This information can indicate that the preparation of these students reached good levels, which have allowed them to begin work immediately upon completion of their professional training.

Figure 12. Time required to obtain the first job



When taking into account the work permanence of the graduates is a factor that can be related to their individual capacities, as well as indicate effectiveness and efficiency when assessing the training of students, and how their performance in the jobs will make That is maintained in the same company. On the other hand, it is also possible to interpret that the graduates change of work in search of better labor and / or economic perspectives, or that the realized works did not fulfill their personal expectations. 56.3% have done two jobs in these years, 4 (25%) have three jobs and 3 of them (18.75%) only one.

Figure 13. Number of jobs done

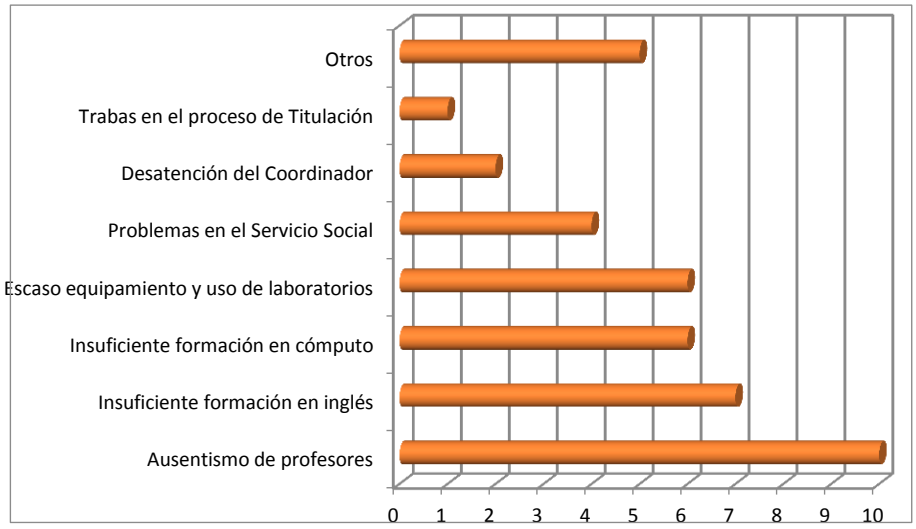


Depending on the type of company and the organization chart, they will be able to obtain a promotion in that place. However, it will depend directly on the professional performance that graduates perform in their jobs. In this aspect, 7 graduates (43.75%) have obtained promotions in their work places, which we can interpret that thanks to their training, performance and knowledge reach such promotions.

Figure 14. Opportunities for career advancement

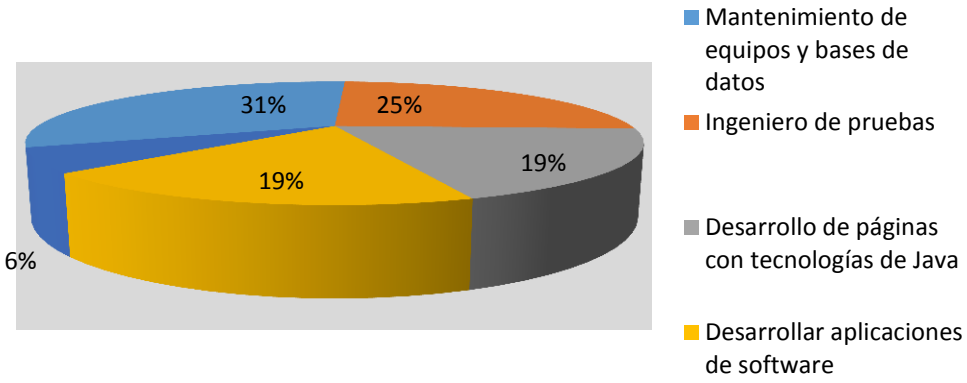
Within the university formation students can perceive and / or be affected by several problems where the Institution is directly responsible for them, all related to the academic part, taking into account several factors, which cause some problems for the learning of the students. Unfortunately, the first problem mentioned by the students is teacher absenteeism, with 52.5%, followed by insufficient training in English with 36.6%, considering that most of the literature is in that language. Other aspects that draw attention is the scarce equipment and use of laboratories, and training in the area of computation, both with 31.6%, taking into account that it is a bachelor's degree where the important thing is to use updated equipment and programs with the same perspective.

Figure 15. Problems in academic formation



We can observe that the graduates when entering the companies acquire different types of jobs according to their capacities, knowledge and abilities, which allow to acquire obligations, responsibilities and learning in those places where they are currently performing. In this case, 5 (31%) perform maintenance of equipment and databases, followed by Test Engineer with 4 (25%) cases, development of pages with Java technologies and development of software applications with 3 (19 %) Each of the mentioned options. It should be noted that of the total number of graduates, at the time of the survey, only one of them (6%) is unemployed.

Figure 16. Labor activities performed



Discussion

The follow-up of graduates of the degree in Computer Engineering does not have studies carried out in the country, however it is necessary to carry them out with the objective of determining if the institutions that dictate the programs have evidence that allows to standardize the delivery of the Subjects that are part of the curriculum.

At least two similar studies of institutions that address the subject related to the follow-up of graduates are available on the Web, which have some similarity in the aspects that were considered in carrying out the present investigation.

In 2010, in a study carried out by the Autonomous Metropolitan University (UAM), the average age was 25 years, which coincides with Gonzalez and Carrillo (2015), at the Centro Universitario de los Altos, who point out that the average age of The graduates were 26 years, while our research is 25 years. As González and Carrillo (2015) point out, the age of the graduates is low, their performance in the work environment is high. Regarding marital status, the UAM indicates 100% of single students, like our study, while the authors mentioned above indicate 86%.

As for the sex of the students who studied the degree in Computer Engineering in the study carried out by the UAM, 80% corresponded to men and 20% to women. These values agree with those obtained in the present study (81% men and 19% women).

On the origin of the students we can observe that 100% of them are of Mexican origin as mentioned in the study carried out by the UAM (2010), and those obtained by us.

Parental schooling is essential for students to undertake higher education. Taking into account studies carried out in other universities mention that 50% of the parents finished the degree and 50% the high school (UAM 2010), while others mention that a high percentage finished higher studies (González and Carrillo 2015) .

The study of the UAM (2010) and Gonzalez and Carrillo (2015) indicate that 100% of the students are working while our study reflected a percentage of the 99%, since only one of them is unemployed. The way to achieve this, in the studies consulted, were similar, taking into account the importance of the family recommendation factor, and there was great influence to achieve this purpose in the radical theory (Ávila et al., 2014).

The choice of bachelor's degree is an important factor for staying and terminal efficiency in higher education. This is determined in terms of the percentage of students that I consider as the first option the degree in Computer Engineering. Studies by the UAM (2010) indicate that 80% of the respondents chose it in the first place, however González and Carrillo (2015), indicate only 67%, on the other hand, the data obtained in our investigation was 87.5 %.

After completion of the studies, the dedication and type of employment reflects in a certain way the level of preparation of the students during their stay in the University, demonstrated in professional activities demoted in the labor market, with 50% in their area of preparation and 20% in education (UAM, 2010). On the other hand, González and Carrillo (2015), show that 34% of the students graduated from the Degree in Computer Engineering in CUAltos work in their area of training, on the other hand, Bárcenas (2014), indicates a 39.2%. The values obtained in our study were 75% in various areas related to computing.

When referring to the size of the companies where the graduates of the different Universities currently work, the values that fluctuate between 40% and 50% are considered as large. This is directly related to the concept of the academic level obtained in their studies of higher education. González and Carrillo (2015) mention that the level of evaluation by students was considered with an average of 8, a similar value in the present study.

Another aspect in which the results of the studies coincide is related to the deficiencies observed by the students, such as: lack of practices and specialized laboratories in the field of Computing.

Conclusions

According to the survey data, it is concluded that:

- Thanks to the training of the students of the Degree in Computing, the inclusion to the labor sector happened during the first year of having graduated. This allows us to determine that the academic program is adequate to the demands of the market. On the other hand, the students' opinion about the quality of their training, who consider it good to excellent (80, 25%).

- Although the preparation of the parents has low levels of education, they were a fundamental pillar for the students to reach the goal of obtaining the professional title.

- The promotion in the various companies in which graduates currently work, has been favorable, taking into account that only two years have completed their undergraduate studies. It is important to emphasize that almost 77% of the graduates showed some degree of interest in continuing their preparation through postgraduate studies of the specialty.

- It should be noted that the results regarding the main difficulties faced by students during their stay at SITC refer to the absenteeism of the teachers who taught the subjects, as well as the lack of infrastructure, preparation of laboratories and their equipment And the absence of inclusion of a second language as part of the curriculum grid compulsory.

Finally, it is necessary to mention that at present some companies dedicate part of their budget for the updating of the employees, thus benefiting to the recently graduated students, fomenting the interest to realize certifications and postgraduate studies, supporting their labor formation.

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